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A BOLD 21ST CENTURY STRATEGY FOR U.S. ARMY AIRBORNE ISR

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ABSTRACT

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The airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities of the U.S. Army could provide the Joint Commands their essential tools to support battlefield interdiction in the 21st Century. Various sensor packages are available today to provide the intelligence and/or information needed to project multiple modes of firepower on target. The U.S. Army has been adding to its existing ISR fleet by fielding unique sensor-integrated Quick Reaction Capabilities (QRC) to answer the short term ISR needs of the Global War on Terrorism (GWOT). These ISR QRC assets have helped increase the density of ISR capabilities across the battlefield, but they have been operationally integrated without meeting the persistent "unblinking eye" requirement. These assets were procured using un-forecasted supplemental funding, and more importantly, they were acquired without a guiding strategy to help identify the requirements and develop an integrated master plan to sustain the U.S. Army's ISR capabilities into the future. The purpose of this paper is to review and discuss the past and present issues that have impacted development of today's combat ISR capabilities within the U.S. Army, and to recommend an affordable ISR strategy to support the long term ISR needs of the GWOT.

A BOLD 21ST CENTURY STRATEGY FOR U.S. ARMY AIRBORNE ISR

> The ability of the future force to establish an "unblinking eye" over the battle-space through persistent surveillance will be key to conducting effective joint operations.
>
> 2006 Quadrennial Defense Review [1]

In today's Global War on Terrorism (GWOT), in both Afghanistan and Iraq, our joint forces face an enemy that provides no advance warning of its intentions and continues to use hit and run terror tactics to cause death and destruction. Given these enemy tactics, our nation's Intelligence, Surveillance, and Reconnaissance (ISR) capabilities are in great demand. The Department of Defense offers the vision above to help the military intelligence communities steer the development of ISR capabilities to meet operational requirements. The current U.S. Army ISR systems in the field provide ISR capabilities that support the field commanders with actionable intelligence to develop the tactical situation and provide situation awareness.[2] To be effective on today's joint battlefield, the fielded U.S. Army's ISR systems must communicate over established net-centric intelligence modes, provide for persistent or "unblinking eye" capabilities, and be available 24 hours a day and 365 days of the year.[3] To date though, the fielded U.S. Army ISR systems have not provided the capabilities described above, because they were not designed to do so.[4] The current ISR systems were bought and delivered with supplemental funding to fill an immediate ISR need of our troops on the ground without being integrated through an ISR long term modernization strategy.[5] This paper will identify key ISR strategic decisions and programs that drove the U.S. Army's ISR capabilities for the past 15 years, review the current U.S. Army ISR capabilities and shortcomings that resulted from these past decisions, and then recommend a bold new strategy that will provide the framework to develop and field the best ISR capabilities for our combat troops.

U.S. Army's Tactical ISR History

Historically, U.S. Army airborne ISR has been centered on fulfilling the requirement to provide the commander with the best information to help conduct combat operations. MG John Porter used an early version of airborne reconnaissance during the Civil War when he ascended into the air in Thaddeus Lowe's hot air balloon to observe Confederate positions.[6] The hot air balloon's utility to allow an aero observer "to look down on the enemy position as if arrayed on a chessboard presented an unparalleled opportunity. Porter's airborne reconnaissance triggered commanders' realization of the vital importance of augmenting ground reconnaissance by aerial means."[7] Throughout World War I and World War II airborne reconnaissance continued to be

used by the U.S. Army with hot air balloons and special aircraft equipped with photographic cameras.[8] With the National Security Act of 1947, the U.S. Army was provided the authority to continue to own airborne reconnaissance capabilities.[9] In 1956, Secretary of Defense Charles L. Wilson tried to provide more direct guidance when he declared that, "The Army Aviation Program will consist of those type of aircraft required to carry out the following Army functions envisaged within the combat zone - observation, visual and photographic reconnaissance, fire adjustment, and topographical survey."[10]

Following Secretary of Defense Wilson's directions, the U.S. Army, in association with the U.S. Navy, jointly developed and produced the OV-1 Mohawk aircraft surveillance system. The Mohawk's mission was to provide the Army field commander with photo observation and electronic reconnaissance in daylight, darkness, or bad weather. During the next half century the U.S. Army continued to produce several other variants of tactical intelligence collection mission aircraft that directly supported its Corps and Division commanders in the field. The onboard system technologies provided Electronic Intelligence (ELINT), Communication Intelligence (COMINT), Signals Intelligence (SIGINT), Synthetic Aperture Radar (SAR), Electro Optical / Infrared (EO/IR) Imagery, and Measurement and Signature Intelligence (MASINT) to the tactical commanders on the ground.[11]

By the 1990's, U.S. Army ISR capabilities dominated the tactical intelligence collection fields. As the United States went to war in Desert Storm, and despite its tactical success, the Army's ability to support the war's joint ISR needs could not be demonstrated. This was due to the Army ISR systems' ability to operate only within the Army's tactical command links, and not within the robust joint commander's communication nodes. In fact, many of the ISR systems used in Desert Storm were not interoperable; this hindered the delivery of intelligence to the warfighters who needed it.[12] Different system architectures (i.e. sensor, communication, software, etc) used for each ISR system by the various Department of Defense agencies complicated efforts to achieve compatibility and maximize effectiveness.[13] The demonstrated lack of compatible ISR capabilities that prevailed in the combat zones of Desert Storm were the catalyst used to drive the Department of Defense's development of Joint ISR requirements to provide the U.S. Army a clear ISR road ahead.

Operational Fleet of ISR Airborne Reconnaissance Systems

The U.S. Army's airborne reconnaissance fleet on September 11, 2001, was designed to meet the tactical intelligence collection requirements developed following the Korean War. In particular, the "collection capabilities predominantly reflected a Cold War era reconnaissance

paradigm, one of periodic looks and sampling."[14] The overall system architecture of the airborne reconnaissance fleet was designed as a closed system to meet Army's tactical requirements of the day, and was not designed to easily accommodate future upgrades. The Army's legacy fleet consisted of the Guardrail Common Sensor, the Airborne Reconnaissance Low, and the rotary wing tactical reconnaissance system called the Quickfix.

Guardrail Common Sensor

The Guardrail Common Sensor (GRCS) has been the backbone of Army airborne reconnaissance systems since 1979. The GRCS system is integrated onto a C-12 series aircraft with a gross operating weight of 16,500 lbs. The GRCS airborne systems provide the Army commanders with precision SIGINT, and a multi-platform airborne geo-location targeting capability. The specific SIGINT capabilities are intercept, processing, direction-finding (DF), and targeting. The GRCS unit is equipped for operation for up to 20 hours per day for 30 days.[15] The GRCS is piloted by two Army aviators, but the SIGINT system is operated by as many as 24 intelligence operator/analysts on the ground via a line of sight interoperable data link (IDL). The GRCS in several configurations has been used effectively in Korea, Central America, DESERT SHIELD/DESERT STORM, and JOINT ENDEAVOR. Since beginning its service to the intelligence community in 1979, the GRCS has been upgraded several times and is currently fielded (1998 fielding) in a GRCS System 2 configuration which provides for new on board processing capabilities, and a direct air-to satellite relay link.[16]

Airborne Reconnaissance Low

In 1996 the U.S. Army replaced the 30-year-old OV-1 Mohawks in Korea with the Airborne Reconnaissance Low (ARL). The ARL aircraft system configurations include an integrated moving target indicator (MTI), the Super Hawk airborne signals intelligence system, a belly mounted camera with both visible light and wide band infrared sensor capabilities, and a SAR. The ARL uses a DeHavilland Dash-7 high wing aircraft which allows for unrestricted visibility for the belly mounted camera system, SAR, and the integrated antenna array used by the Super Hawk SIGINT system. The ARL series capabilities were created in response to USCINCSOUTH's urgent requirements for radio frequency direction finding and electro-optic capabilities in low intensity operations. Specifically, the ARL was designed to support stability and military operations other than war in the SOUTHCOM area. The ARL has also seen service during operations in Haiti.

Quickfix

Quickfix is a rotary wing tactical reconnaissance system mounted on an EH-60 Blackhawk helicopter. Quickfix employment was from an altitude of 10,000 ft. to optimize the system's direction-finding accuracy. Throughout the late 1980's, Quickfix performed well at several National Training Center exercises where it was allowed to fly at its optimal altitudes. However, when it was deployed to DESERT STORM, Quickfix was not effective because helicopter traffic was restricted to 500 feet or less above the ground. This altitude limit proved to be the downfall to the Quickfix's tactical utility. Also, because of the Quickfix's tactical heliborne platform, the system gained little attention from the joint arena following DESERT STORM.[17]

DOD's ISR Focus on Joint Operations in the Decade of the 90s

DESERT STORM's tactical ISR lessons learned would provide focus to DOD's ISR strategy and bureaucracy.[18] Following DESERT STORM, U.S. Army ISR strategy and projected funding were guided by two specific directives, an Integrated Airborne Reconnaissance Strategy and Joint Vision 2010. Each of these documents provided a course for the U.S. Army's ISR community to follow to meet joint ISR requirements, and to help provide near term interoperability within the joint community. Over the next ten years (1990 – 2000), the U.S. Army's ISR community began to focus on meeting the demand for joint communications across multiple intelligence nodes and the development of UAV capabilities to support and enhance the manned ISR fleet's density overhead.

Integrated Airborne Reconnaissance Strategy

In 1993, the House Armed Services Committee directed the Secretary of Defense to provide an Integrated Airborne Reconnaissance Strategy (IARS) to support the post-Cold War future. The Defense Airborne Reconnaissance Office (DARO) was established and chartered as the proponent for the IARS within DOD, and completed the strategy in 1994.[19] The IARS scope included an assessment of the airborne reconnaissance needs of the U.S. through 2010, a more unified acquisition approach to ISR system architecture, and enhanced management and acquisition of manned and unmanned airborne assets.

Once released to the services, the U.S. Army ISR community saw benefits in the IARS requirements for an ISR Joint Technical Architecture (JTA).[20] Under IARS, the proposed JTA open system architecture would be designed to provide this capability, and be integrated across the current fleet to meet the joint requirement of interoperability. DARO funded development of the JTA standard, and expected spin off technology would support the Distributed Common Ground System (DCGS), the Common Data Link (CDL), and the Joint Airborne SIGINT

Architecture (JASA) by the year 2000.[21] Unfortunately, though technology development was initiated, spin off technology did not mature, and problems integrating the Army's tactical ISR systems into the strategic IARS became a key issue between the Army and DOD.[22] As a result, the Army's ISR system architectures were individually designed to support single tactical communication nodes, and were unable to pass data across multiple strategic nodes simultaneously.

Unmanned Aerial Vehicles (UAV) development was also a key to the IARS.[23] DARO focused attention on the overall balance between manned and unmanned platforms, with a clear program to develop and utilize more unmanned systems. DARO's strong unmanned acquisition strategy position eroded DARO's overall strength within the ISR community when DARO proposed a change in the DOD requirements for manned and unmanned ISR assets. DARO's decision to pursue unmanned systems conflicted with the services' manned ISR funding programs and influenced OSD reprogramming actions in favor of UAV development, over the services' legacy manned fleet modification programs.[24] DARO was created to effectively manage DOD's disparate airborne reconnaissance programs, but was disbanded in 1998, amid further criticism of problems, redesigns, and UAV accidents within a family of systems that it was formed to develop.[25] The DOD programs that were identified with the IARS, and that completed the development phase, are still waiting integration into the U.S. Army's fleet.[26]

Joint Vision and Army Vision 2010

The Joint Chiefs of Staff developed Joint Vision 2010 (JV 2010) in 1996 to provide a conceptual template for how America's armed forces would fight, and how technology would be leveraged to gain new levels of effectiveness in joint warfare.[27] Key to the vision of the Joint Staff, was the assumption that the information age was going to provide dynamic improvements in the warfighters' intelligence and command and control capabilities, as already limitedly demonstrated in DESERT STORM. Further, Joint Vision 2010 proclaimed that "Full Spectrum Dominance will be the key characteristic we should seek for our Armed Forces in the 21st Century."[28] A specific concept within Joint Vision 2010 was Precision Engagement. Precision Engagement called for a system of systems "that enables our (ISR) forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to re-engage with precision when required."[29] The U.S. Army took Joint Vision 2010 and developed Army Vision 2010 as a blueprint for the Army's contributions to the DOD's Vision. Under the category of Precision

Engagement, Army Vision 2010 stated that shaping the battlefield starts with the application of ISR systems through the Intelligence Preparation of the Battlefield (IPB).[30] These documents helped joint strategic ISR planning to evolve from a Cold War focused, rigid, process at the decade's start, to a more flexible, vision oriented, and resource focused process at the decade's end.[31]

U.S. Army's Funded ISR Modernization Programs

Following Army Vision 2010, and with DARO's IARS support, the Army did invest in the future, but the ISR modernization programs that were to take the U.S. Army's ISR capability into the 21st Century failed to materialize due to DOD or Army critical programmatic cost, schedule, and/or performance impacts. Prior to September 11, 2001, the U.S. Army had several acquisition programs that were designed to meet the joint ISR requirements dictated by the Army Vision 2010. The three major programs of record that would provide the enhanced ISR capabilities for the future were identified within the Aerial Common Sensor (ACS), the Hunter Unmanned Aerial Vehicle (UAV), and the Comanche Helicopter Mission Equipment Suite acquisition programs.

Aerial Common Sensor

The Aerial Common Sensor (ACS) was a joint U.S. Army/U.S. Navy program conceived to produce an evolutional intelligence collection system of systems and replace the three existing reconnaissance aircraft; GRCS, ARL, and EP-3E Aries. The ACS program acquisition strategy called for a three phased acquisition plan that would be used to down select to one contractor. The contract to produce the ACS was awarded in August 2004 to Lockheed Martin. The Lockheed Martin contract required the ACS to include three major subsystems: the Ground Processing Facility (GPF), the Airborne Platform Subsystem (APS), and a reconfigurable suite of sensor processors, and collection reporting equipment called the Airborne Mission Equipment Subsystem (AMES).[32]

Because all intelligence collection equipment must be capable to receive multiple data streams, the GPF was to be compliant with both Joint Airborne SIGINT Architecture (JASA) standards and the Joint Interoperable Network (JOIN). The GPF was also capable of being operated with the TENCAP Tactical Exploitation System (TES), and deployable within a standard C-130 Hercules cargo hold.[33]

APS was to be a non-developmental aircraft platform that was already being built commercially, and would meet the payload requirements of the AMES. AMES would provide

the primary mission equipment that included a DOD-compliant SIGINT collection system, (camera / line scanners) IMINT, and MASINT sensors.[34]

ACS could have been the eyes and ears of the 21st century commander, and would have given the ground commander the ability to detect troop movement, intercept enemy communications and radar transmissions, and communicate with other aircraft.[35] The ACS, like the GRCS and ARL legacy systems, could have made a vital contribution to the commander's comprehensive awareness of the battlespace.[36] The ACS was the Army's ISR keystone to achieving information dominance into the foreseeable future, but in January 2006 the ACS program was terminated by the Army for cost growth and not meeting aircraft weight requirements.[37]

The Hunter UAV Program

With support from the DARO, the U.S. Army pursued an ISR UAV capability under the Hunter UAV Program in the early 1990's. Survivability, cost efficiency, and proven tactical performance in DESERT STORM attested that UAVs had a bright future. The Hunter UAV was originally planned to fulfill the Army's short range tactical UAV requirement and support Army commanders from echelons above corps (EAC) to armored cavalry regiments (ACR) at deep battle ranges of up to 300 km for eight or more hours of endurance. Technical difficulties halted pre-production in 1996, and "the Joint Requirements Oversight Council (JROC) strongly recommended the termination of the Hunter program in light of the potential contributions of other UAVs, especially the U.S. Air Force Predator."[38]

Although the Hunter program was cancelled, the U.S. Army continued to study the operational capabilities of the UAV concept by reusing the residual assets from the Hunter program. The Hunter UAV program's residual assets consisted of seven (7) Hunter platforms that were produced during the Low Rate Initial Production phase. The U. S. Army, using the seven (7) LRIP platforms, began to develop concept and operations data through operational use in the Balkans in 1999.[39] The Hunter standard sensor package consisted of an Electro-Optic sensor payload for day and night time reconnaissance and surveillance. In 2002, the Hunter UAV system was used in a joint helicopter/UAV experiment to demonstrate the use of UAV's in concert with the AH-64 Apache and Comanche (RAH-66).[40] In addition, arming the Hunter UAV was accomplished using Brilliant Anti-Armor sub-munitions (BAT) at White Sands Missile Range in October 2002.[41] These seven LRIP assets would later play a major role in meeting the Army's immediate ISR requirement in Iraq.

The RAH-66 Comanche Helicopter

By design the RAH-66 Comanche Helicopter was to enhance the U.S. Army's airborne reconnaissance capabilities with the integration of stealth technology, improved communications interoperability, and several types of sensor suites. The Comanche Helicopter was to be the ground commanders "eyes and ears" on the battlefields of the 21st Century.[42] The Comanche was designed to evade threat radar system, as it flew deep into the combat area, and use its sensors for target detection and identification, and transmit target data throughout the joint community. For interoperability and commonality, the Comanche would utilize the Air Force's Integrated Communications Navigation Identification Avionics (ICNIA). To move the digital information, RAH-66 Comanche would use the Improved Data Modem (IDM), which incorporates digital protocols and receives data from Army, joint, and combined forces. The digital protocols consisted of: the Variable Message Format (VMF), Advanced Field Artillery Tactical Data System (AFATDS), Tactical Fire Direction System (TACFIRE), and Marine Tactical System (MTS). The Comanche had an Embedded Global Positioning/Inertial Navigation System (EGI) for accurate and fail-safe navigation worldwide. It was integrated with a suite of sensors, which consisted of an electro-optical target acquisition system (EOTAS), and the Longbow fire control radar that could see the battlefield in different spectrums to provide a detailed picture to commanders on the ground. The EOTAS provided an enhanced capability when compared to the fielded OH-58D and AH-64 Apache Forward Looking Infrared (FLIR) sensors.[43]

The RAH-66 Comanche Helicopter was the U.S. Army's aviation modernization priority in the later part of the 20th Century. Throughout its 20 year history (1984-2004), the Comanche program had multiple program restructurings and cost issues that caused the program to finally be cancelled in February 2004. Some of the driving forces that put the nails in the Comanche's coffin were the Future Combat Systems (FCS) program cost estimates, which began to drive the U.S. Army's funding future in 2004, and the success of the Joint ISR Unmanned Aerial Vehicles (UAV) programs in development and in operations in Bosnia, Afghanistan, and Iraq.

The Army's ISR modernization programs were going to be the key to meeting future ISR requirements. When the ACS, Hunter, and Comanche programs were cancelled, the U.S. Army's long term programs on meeting the Joint Vision 2010 ISR requirements were suspended, and GWOT requirements quickly drove the Army to focus on short term solutions. Rapid technology thrusts, and the growing combat ISR needs within Afghanistan and Iraq, began to drive the Army to quickly develop equipment that could meet immediate ISR requirements. This set of circumstances caused the available fleets of ISR assets, with varied

capabilities, to be placed into combat where new uses for existing technology and capabilities were found.

The Army's ISR Capabilities during OEF and OIF

When our forces deployed to Afghanistan and plans were being made for Iraqi Freedom, the only ISR system capabilities available were not products of Joint Vision's 2010 ISR long term strategy. The ISR capabilities available consisted of the Cold War ISR airborne reconnaissance fleet that had operated in DESERT STORM, a limited supply of Hunter UAVs, and several quickly procured Quick Reaction Capabilities (QRC). The last three years of limited U.S. Army ISR funding prior to September 11 resulted in these limited SIGINT capabilities. Because the Cold War fleet of manned airborne and un-manned ISR systems was in limited numbers, QRC systems were procured quickly to provide additional capability to effectively provide targeting data and to communicate this information and imagery to the ground commander in support of combat actions.

The high demand for ISR support in each campaign brought various ISR systems into the fight. The U.S. Army's movements into Afghanistan were initially supported by the U.S. Air Force Predator UAVs and other ISR fixed wing assets brought into theater by the Special Operations Command. As the situation developed, the U.S. Army provided units in Afghanistan with individual UAV systems.[44] In March 2003, as the U.S. military entered Iraq and drove to take Baghdad, the Army's ISR capabilities were enhanced with both manned and unmanned aerial reconnaissance assets. Though possibly antiquated, the U.S. Army Guardrail aircraft provided limited SIGINT collection capabilities, and its aerial direction finding system proved to be a key aerial reconnaissance asset. With the wartime funding increases provided in early 2002, the Guardrail systems were selectively upgraded to meet the requirements of the many different individual threat signal environments.[45] Also Airborne Reconnaissance Low aircraft, from the continental United States, were directed to fulfill the requirements for multi-intelligence aerial observation and reconnaissance. The ARL platforms provided the ground commanders, not only SIGINT and Radio Direction (RF) finding target coordinates, but also day or nighttime imagery of the exact RF target area. Given the limited quantity of Guardrail and ARL's systems, additional manned airborne ISR assets were also produced under a Quick Reaction Capabilities (QRC) contract to help ground convoy commanders. Specifically, the U. S. Army Intelligence and Security Command's (INSCOM) Medium Altitude Reconnaissance Surveillance System (MARSS) and Airborne Reconnaissance Multi-Sensor System (ARMS) capabilities were provided "to take back the roads."[46]

Unmanned systems have played a major role in current operations, with at least 11 types of UAVs being used during Operation Iraqi Freedom. The Army has flown UAVs around the clock to support individual unit reconnaissance and surveillance requirements. The key airborne UAVs have been the vehicle launched pre-production set of RQ-5A Hunters, the RQ-7 Shadow 200, and the hand launched Raven systems. The goal is to give every battalion in Iraq and Afghanistan small, hand-lunched UAVs.[47] "The Army is procuring an additional 185 Raven systems to support an urgent wartime requirement" according to Lt. Col. Andrew Ramsey, Product Manager for ground maneuver UAV systems. The U.S. Army continues to procure more Shadow 200's as well.[48]

The wars in Afghanistan and Iraq have shown that the current Army ISR assets sent into theater can be effective, but these assets all have limited life constraints, and must be replaced in time. A consolidated ISR modernization strategy needs to be established to manage resources, integrate existing joint vision initiatives, and identify the equipment for disposal that can not be modified to meet long term requirements. The U.S. Army needs to begin to develop a new long term strategy to manage its ISR assets now and for the future.

Long Term ISR Strategy Planning Concerns

U.S. Army ISR needs a clear roadmap to follow into the 21st Century, and several concerns must be addressed in this roadmap. First the Army's primary focus on Quick Reaction Capabilities (QRC) to meet immediate requirements must be addressed. Secondly, the U.S. Army's failure to establish proper funding strategies and structured priorities to procure and maintain fully capable programs can not be continued.[49] Finally, the U.S. Army must understand how to impact the Army's ISR future by focusing on the Intelligence Communities' budgeting process and leveraging the types of funding directed at joint capabilities from the U.S. Congress.

Quick Reaction ISR Systems Dominate Short Term Focus

The Army's current combat ISR systems are being approved and funded to support one-time deliveries of ISR QRC, without considering a centralized acquisition strategy that focuses on technology insertion requirements across the fleet for future sustainment growth. To support the war in Iraq, the Army ISR requirements focus primarily on capabilities required to effectively track and take down an individual, or cover convoy movements within the area of operations.[50] These systems in the beginning of the war were limited to the UAV community because of quick commercial (off-the-shelf) procurement actions, and specific UAV payload requirements. The Army has funded several lots of the hand launched UAV Raven to meet urgent combat needs,

but in time the Raven will have to be shelved because of a lack of "designed in" expansion capabilities in both the payload area and system software architecture.[51] Also, the Aerial Reconnaissance Multi Sensor (ARMS), introduced into Iraq in 2006, has enhanced multiple sensor technologies. The ARMS is a modified C-12R that is equipped with a MX-15 Electro Optics camera with enhanced FLIR, color spotter, wide zoom capabilities, laser illuminator, laser designator, embedded navigation, and precision geo-location capabilities. The ARMS provides mission commanders a simultaneous downlink of video imagery that can be used to identify convoy hazards and identify targets for the Quick Reaction Forces (QRF) to take down.[52] Though clearly of value today, the ARMS has no future sustainment funding identified within the Army's ISR resource budget. The Cold War airborne reconnaissance assets are also at risk now because of the high costs to maintain these capabilities, and no 21st Century vision to guide product improvements.[53] Any selected upgrades are specifically directed at operations in OIF, and not long term solutions for worldwide operations.[54] The requirements for U.S. Army ISR for the 21st Century will not be met by continued QRC procurement actions. We must continue to capitalize on lessons learned from today's combat operations to modernize the existing aero reconnaissance fleet to meet joint interoperability requirements.

Current U.S. Army ISR Program Funding is Unstructured

Though much of the manned and unmanned ISR capabilities presently in the field have proven to be successful, the overall future funding strategy to support long term ISR assets has not been fully defined because of the short term funding increases currently available to the fleet. Prior to September 11, 2001, ISR program sustainment and growth was stagnant due to the low ISR funding priorities over the previous 10 years. After the events of September 11, funding for the Army's ISR requirements became available from multiple sources. Un-programmed funding plus-ups from the U.S. Congress funded the ISR fleet's backlog of badly needed system software and hardware updates, and procured new off the shelf QRC ISR systems to fill immediate needs.[55] Also, numerous cancelled acquisition programs within the previous eight years provided unplanned funding to the ISR community. For example, the short term funding (within the 5-year POM) that remained in the Hunter UAV, Aero Common Sensor, and Comanche Program accounts was transferred to help enhance the current fleet of U.S. Army ISR airborne reconnaissance systems. In the 90s, the Hunter UAV Program had over $984.7 million dollars of savings when the program ended, that should have been returned to the Army, but DOD only released about $100 million to procure one more Hunter system and $15 million for the Guardrail Common Sensor.[56] As the Aerial Common Sensor program closed,

remaining funding was programmed to ARMS and other high demand items for system sustainment of the Guardrail Common Sensor and the Airborne Reconnaissance Low Systems. In addition, the ACS funding was moved to develop and field a more enhanced common data link with capabilities to control sensor payloads of UAVs within line of sight range.[57] A third of the Comanche program funding was reprogrammed to meet the Army's ISR procurement needs for the new Army Reconnaissance Helicopter (ARH). The remaining Comanche funding went to help Army Aviation with the UH-72A Lakota, a light-utility helicopter for Army Guard and Reserve, and to fund the Army's future Cargo Aircraft. Providing un-programmed funding to pay for immediate needs does help, but it is not an adequate funding strategy for sustaining a fleet of ISR equipment.[58] The U.S. Army needs to consider centralizing the long term funding strategy for ISR systems now, and establish a baseline funding level that can sustain and modernize the current deployed ISR fleet and identify future ISR funding requirements.

National Intelligence ISR Focus Key to Future

The future of U.S. Army ISR capabilities is being influenced by Congressional proposals for programming and budgeting procedures within the DOD and intelligence agencies. Over the past 10 years the U.S. Congress has been trying to understand the procedures that DOD and the Intelligence Communities use for acquiring all ISR systems to ensure an efficient acquisition process is maintained.[59] By 2002 the Intelligence community, through the Director of Central Intelligence (DCI), established a set of performance plans and measures that focused on the value received from proposed intelligence capabilities.[60] The Senate Intelligence Committee acknowledged the DCI's efforts, but indicated that "further work is needed and suggested that developing new systems merely to acquire a new capability was insufficient; the capability had to meet validated intelligence needs."[61] Members of Congress have concluded that the budgeting procedures have not been wholly effective "in the fields of ISR because of inadequate data to compare systems capabilities and costs across the spectrum of national and tactical intelligence programs, an imbalance between collection and analysis programs, and an intelligence effort that does not reflect an optimal allocation of extensive resources."[62]

The U.S. Army ISR programs are primarily funded out of the DOD's Tactical Intelligence and Related Activities (TIARA) budget, but a few sensor systems are funded out of the Director of National Intelligence's (DNI) National Intelligence Program (NIP) and the Joint Military Intelligence Program (JMIP).[63] The TIARA is a "designation applied to aggregations of programs, projects and activities in military services budgets that provide tactical-level intelligence and related support to military operations.[64] National intelligence requirements

funded under the NIP and JMIP have already placed payload sensor systems designed by other intelligence agencies onto Army ISR platforms, and are being used in the field today. Because of this issue of mixing tactical with national intelligence funding requirements, in 2004 the Under Secretary of Defense for Intelligence (USD(I) was charged with overall coordination of intelligence programs to include ISR systems.[65] Given the potential for future Congressional budgetary restraints on ISR programs, with or without a new procedural framework provided by the USD(I), the U.S. Army's acquisition of expensive new systems will require close oversight. Given these factors, a strong integrated strategic ISR plan needs to be developed now if the 21st Century ISR requirements proposed by the 2006 QDR will be approved and funded within the intelligence resources. Only by understanding the different funding strategies available within the national Intelligence Communities, can the Army truly develop and fund an ISR strategy to meet 21st Century requirements.

Proposed Recommendations for U.S. Army ISR Capabilities

The U.S. Army needs a clear strategy for managing, developing, and fighting with ISR capabilities in the 21st Century. Joint Vision and Army Vision 2010 should be resurrected and used as the guiding documents, but the requirement objectives for the 21st century U.S. Army ISR capabilities should mirror the 2006 QDR epigraph presented at the beginning of this paper.

The U.S. Army needs an ISR strategy that orients on joint requirements and a prudent investment funding strategy as key pillars to support reaching the goals of the 2006 QDR requirements. Prominent among these joint requirements is the intelligence goal of persistent surveillance and interoperability across joint systems. The QDR has specified DOD's requirements for persistent ISR capabilities, but to date, no new programs have been identified by the U.S. Army to meet these capabilities. Current QRC system capabilities are being procured to meet immediate needs in the war on terrorism, and are not fulfilling a key strategic requirement for interoperability and cross – cueing across joint sensors.[66] The Army must focus its efforts to develop a persistent sensor system that can provide actionable intelligence in the direct hands of the field commanders, while providing increased situational awareness to the entire joint community.

Centralized Management of ISR within the U.S. Army

To achieve the vision articulated in Joint Vision 2010, the ISR strategy needs to be underpinned by centralized management of ISR requirements to guide system development, and development of tactical methods of employment. To execute this new strategy the U.S. Army should establish a centralized management office to determine requirements, program

funding, develop and produce the ISR systems, and develop the proper force management plan to execute effectively.

The proposed ISR Management Office (ISRMO) should be a new breed of organization with cross fertilization between the user community and the acquisition community. The ISRMO should be staffed by Military Intelligence (MI) officers and civilians with operational deployment experience, who understand ISR sensor capabilities. The ISRMO should also have acquisition trained soldiers and civilians familiar with ISR sensor development, procurement, and integration techniques.

The ISRMO should be given the authority to budget and execute all funding for ISR requirements within the U.S. Army. It would provide the U.S. Army a near term program and analysis function that would produce supportable cost estimates with strong operational data on ISR system capabilities and life cycle supportability. Given this type of analysis capability, the ISRMO would be able to support short and long term funding requirements and have the ability to identify the specific needs to effectively protect and provide the strong resourcing basis for long term ISR funding.

System of Systems Development Strategy

Similar to 1990's DARO mission to manage development and acquisition, the ISRMO would validate the ISR needs, and be the engineering office that produces the unified U.S. Army open architecture design to support the command and control network-centric suites to ensure joint interoperability. The ISRMO should be chartered to pursue a "Horizontal Integration strategy that compels an integrated approach to acquiring and applying collection assets in a planned "system-of-systems" to integrate surveillance capabilities across the various human and technical intelligence disciplines and national, theater, tactical, and commercial programs."[67] The ISRMO would orient on a common core of ISR requirements and establish near and far term technology insertion schedules for the current ISR fleet, thereby preventing continued focus on only "immediate requirements." Also, the ISRMO should be the central clearing house to identify disposition instructions for removal of marginal QRC systems in the field.

The U.S. Army's ISR Research and Development (R&D) resourcing strategy should include the investment in the best ISR sensor and airborne platform integration technology available. The technology should allow for capabilities that can enhance reliability, persistence, deployability, interoperable communications, ease of use for the operators, and the exploitation of actionable intelligence down to the tactical commander. The airborne platforms should be

managed by an aviation organization that specializes in ISR platform procurement and sensor integration, to include manned and unmanned airframe procurement.

The ISRMO needs to be able to develop enhanced manned and unmanned ISR system concepts, and develop the key operational employment techniques, as well as QRC material design solutions in a field environment. The best approach to accomplish this is to have an operational unit assigned similar to Army Aviation's Aviation Applied Technology Directorate (AATD).[68] This operational unit would be based on a modified operational Intelligence Collection Company's Table of Distribution and Allowance (TDA), augmented with acquisition soldiers and civilians who have the specific authority to develop and test an evolutionary ISR acquisition strategy. The company would be the Army's experimental ISR system development Center of Excellence with oversight for developmental testing of new systems and Advance Technology Demonstration (ATD) programs. If required, the proposed experimental company could be attached to the Battlefield Surveillance Brigade for operational deployment exercises.

DOD Support for U.S. Army ISR Strategy

The ISRMO should also be represented on the Department of Defense ISR Integration Council.[69] Because national intelligence support is key to U.S. Army's ISR strategy, the ability of the ISRMO to be represented on DOD's ISR Integration Council would provide the key credibility and visibility needed to support the Army's requirements and adequately justify program resources at the strategic level. In compliance with Congressional directives, the council is developing an ISR Integration Roadmap that will provide guidelines for future capabilities, articulate the fundamental ISR goals, establish "trade space" boundaries within which the Departments Investment strategy will be built, and identify the options for funding.[70] Annually, the DOD ISR Integration Council is charged to document the Department's ISR capabilities to the Congress. The ISRMO would reinforce Army positions under this congressional oversight to help the U.S. Congress understand and adequately fund the Army's ISR requirements.

Conclusions

Intelligence, Surveillance & Reconnaissance capabilities have been demonstrated throughout the Army's history, and the intelligence provided by ISR sensors have countless times helped win numerous battles and campaigns. In the past 15 years, the U.S. Army ISR community has not consistently gained DOD's ISR program sponsorship and resources, while learning to fight in the joint community.

After September 11, 2001, the U.S. Army's combat actions into Afghanistan and Iraq demanded immediate ISR capabilities. Given the availability of funding to match this demand, the U.S. Army procured equipment without using a clear ISR capabilities strategy as a roadmap. Despite these short term successes to meet immediate ISR requirements, the U.S. Army needs to now develop an overarching ISR strategy to guide ISR development to support future joint combat operations. The strategy presented within this document provides a sound basis to start.

Endnotes

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[53] U.S. Congress, Senate Cambone, 2004, 10.

[54] U.S. Congress, Senate Alexander, 2004, 16.

[55] Ibid., 17.

[56] Sink, 11.

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[59] Best, 2.

[60] Ibid., 3.

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